



PATENT  
0808-0347P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Heon-Sang LEE et al. Conf.: 1179  
Appl. No.: 10/775,147 Group: 1713  
Filed: February 11, 2004 Examiner: Cheung, William  
For: HEAT ABSORB-RELEASE PLASTIC RESIN  
COMPOSITION AND MOLDED PRODUCT THEREOF

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Dr. Heon Sang Lee declare and say as follows:

1. I received my B.S. in Chemical Engineering from Korea University in 1992. After that, I received my M.A.Sc. in Chemical Engineering from Korea University in 1994 with a thesis entitled "Solid Mixing of Different Density Systems in Fluidized Bed." In 1997 I received my Ph.D. in Polymer Engineering/Chemical Engineering from Korea University with a dissertation concerning "Physical Properties and Compatibility Studies of Blends of Engineering Polymers Containing Thermotropic Liquid Crystalline Polymers."

After obtaining my Ph.D. I worked as a Postdoctoral Fellow at the University of California at Berkeley until January 2000. As a Postdoctoral Fellow at U.C. Berkeley I studied the characterization of polymer blends with respect to rheological, thermal, morphological, and mechanical properties.

From January 2000 until the present, I have been employed as a Senior Research Scientist in the Technology Center of L.G. Chemical Ltd. My full curriculum vitae is enclosed.

2. I have reviewed the prosecution history of U.S. Patent Application No. 10/775,147. I am particularly familiar with the rejections of the claimed subject matter over U.S. Patent No. 5,565,132 to Salyer. I am also familiar with the citation of U.S. Publication 2003/0068487 to Nguyen et al. I have reviewed the rejections based upon these references in the Office Actions dated October 28, 2004 and July 2, 2004.

I disagree with the rejections based upon Salyer and/or Nguyen and offer the following comments and experimental evidence to support my disagreement. The disclosure of Nguyen does not alter these disagreements or change the outcome of my arguments and experiments.

3. First, the composite of Salyer differs substantially from the present composite with respect to the amounts of ingredients included. The present composite requires the ratio by weight of the matrix resin material and the phase transition material to range from 60:40 to 80:20 (ratio of 3:2 to 4:1). Thus, the present claims require the phase transition material in small amount of about 1/4 to about 2/3 times as much as the matrix resin material.

In contrast, Salyer discloses a composite comprising about 16-22% of polyolefin (matrix resin material) and about 60% of

phase change material, based upon the total weight of the composite (see column 2, lines 40-45 of Salyer). Thus, the ratio of matrix resin material to phase change material according to Salyer is about 16:60 to 22:60 (ratio of about 1:4 to about 1:3). Salyer therefore requires the phase transition material in an amount of about 3/1 to 4/1 compared to the matrix resin material. These amounts are substantially opposite compared to the amounts required by the present composite.

Based upon this discrepancy alone, the present invention is distinguished from Salyer. Nguyen does not add any disclosure that would alter this discrepancy. Therefore, the rejections made by the Examiner, for instance, the rejections based upon either Salyer or Salyer and Nguyen, are improper.

4. Second, the composite of Salyer differs substantially from the present composite with respect to the Flexural Modulus and room temperature heat conductivity. The present composite requires a Flexural Modulus of 3000 kg/cm<sup>2</sup> or more, and a room temperature heat conductivity of 0.4 W/m-K or more. Salyer fails to disclose these properties; however, to provide quantitative evidence of that these properties are not achieved by the composite of Salyer, the following experiments have been conducted by myself and/or under my direct supervision.

#### Experiments

To quantitatively analyze the composite of Salyer, the composite described in Example 1 of Salyer (which corresponds to

corresponds to composite no. 8 in Example 3) was tested. The composite is the K18/HDPE/EVA/ABS (60/16/8/16), which is the same as described in Example 1 of Salyer.

The produced composite according to Example 1 of Salyer was tested for the properties of Flexural Modulus and Thermal Conductivity. Flexural Modulus was tested using ASTM D790 and Thermal Conductivity was tested using ASTM C177. The results of the analysis of the composite according to Salyer are shown in Table 1 below:

Table 1: Flexural Modulus and Thermal Conductivity of Composite corresponding to Example 1 of Salyer

Ingredients	K18/HDPE/EVA/ABS (60/16/8/16) Corresponding to Example 1 of Salyer
Phase change material (K-18) (wt%)	60
HDPE (wt%)	16
EVA (wt%)	8
Silica (AES) (wt%)	16
Thermal conductivity (W/m-K)	0.19
Flexural Modulus (Kg/cm <sup>2</sup> )	Not measurable (less than 1000)

As is evident from the results shown in Table 1, the Thermal Conductivity of the composite of Salyer is 0.19 W/m-K and the Flexural Modulus of the composite of Salyer is not measurable (less than 1000 Kg/cm<sup>2</sup>). However, the present composite is required to have a thermal conductivity of 0.4 W/m-K or more and

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a Flexural Modulus of 3000 Kg/cm<sup>2</sup> or more. It is therefore evident that the composite of Salyer does not achieve these results.

Nothing in either Salyer or the other reference of Nguyen would motivate the skilled artisan to create a composite, which would meet these limitations, either explicitly or inherently. Accordingly, based upon this additional evidence, the rejections made by the Examiner are improper.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S. Code 1001 and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

By:

Dr. Heon Sang Lee  
Dr. Heon Sang Lee

Date:

Feb. 3, 2005